

shell and in the parting face 18 of the shell holder. For this purpose, respective housings 19 and 20, hollowed out in the facing edges of the afore-mentioned parting faces 13 and 18, respectively, are provided. The bottoms of the housings 19 of the shell 7 constitute flat bearing surfaces on which may 5 bear members for locking the shell holder 9. These locking members may be formed in many ways known to those skilled in the art. In the example shown in FIG. 2, these are projecting lugs 21 drilled with an elongate hole 22 and retained by a screw 23 fixed to the bottom of the corre- 10 sponding housing 20 of the parting face 18 of the shell holder 9; this arrangement has the advantage that the shell is released as soon as the lugs 21 are unlocked and pushed back toward the outside, without it being necessary to remove the screws 23 completely. Notwithstanding this, the shell could 15 also be locked onto the shell holder by using wide-head screws overlapping the flats of the housings 19, or else by using quick-face eccentric-head screws, etc.

It will be noted that in practice the two locking members 21 located on the side adjacent to the axis of rotation 4, in 20 the case of a jackknife mold, do not have to be actuated and may thus constitute simple stops (with the possibility of adjusting the position of these stops) under which the flats of the respective housings 19 are brought when the shell is inserted into the shell holder, by causing the shell to slide 25 rotationally in the latter. Moreover, given the position of these two locking members 21 located in the bottom of the open mold, their access is difficult and their removal would unnecessarily lengthen the process of replacing the shell 7.

As for the rest, each shell holder 9 is designed in the same 30 way as a previous half-mold, which includes the elements necessary for correct operation of the molding device, and in particular the means 10 for fixing it to the corresponding mold carrier 3, the guiding fingers 24 (and the respective housings in the other shell holder) for closing the mold, the 35 rear face provided with a chamber 26 and with an O-ring seal 27 for compensation as shown in FIG. 4. It is therefore possible, in a preexisting installation, to replace the conventional monobloc half-molds with two-element half-molds according to the invention. 40

Needless to say, and as results already from the foregoing, the invention is in no way limited to those of its methods of application and of its embodiments which have been more particularly envisaged; on the contrary, it 45 embraces all variants thereof.

We claim:

1. Device for manufacturing containers, made of a thermoplastic by blow molding or stretch-blow molding of a preheated preform, the said device including at least one mold (1) consisting of two half-molds (2) respectively 50 supported by two mold carriers (3) which are made in the form of enveloping structures and which can move one with respect to the other, characterized in that each half-mold (2) comprises a shell holder (9) supported by the respective mold-carrier (3) and a shell (7) which is provided with a 55 half-impression (8) of the container to be obtained and which can be removably fastened to its shell holder (9) by quick-fixing means (19-23), the shell (7) and the shell holder (9) being in complementary shapes in order to be in at least partial mutual thermal-conduction contact while the

pipes and connections for the circulation of cooling and/or heating fluids (11, 12) are provided exclusively in the shell holder.

2. Device according to claim 1, characterized in that the mating faces (14, 15) of the shell (7) and of the shell holder (9) are in total thermal-conduction contact.

3. Device according to claim 1, characterized in that the mating faces (14, 15) of the shell (7) and of the shell holder (9) are in partial thermal-conduction contact by leaving regions of limited thermal conduction.

4. Device according to claim 1, characterized in that the mutually contacting mating faces (14, 15) of the shell (7) and of the shell holder (9) are approximately semicylindrical surfaces of revolution with an axis approximately parallel to the axis of the impression (8) of the container to be manufactured.

5. Device according to claim 1, characterized in that the mutually contacting mating faces (14, 15) of the shell and of the shell holder are provided with axial mutual-positioning means (16, 17).

6. Device according to claim 5, characterized in that the axial mutual-positioning means comprise a system of one or more mating ribs (16) and grooves (17) extending circumferentially.

7. Device according to claim 1, characterized in that the means (19-23) for quickly fixing the shell (7) to the shell holder (9) are provided on their respective parting faces (13, 18).

8. Device according to Claim 4, characterized in that the means (19-23) for quickly fixing the shell and the shell holder are located on their respective edges parallel to the axis of the impression.

9. Device according to claim 8, characterized in that the quick-fixing means (19-23) comprise, on one side, at least one stop for positioning the parting face of the shell with respect to the parting face of the shell holder and, on the other side, quick-screwing means (23) on the parting face (18) of the shell holder (9) with a clamping surface (21) projecting from the parting face (19) of the shell.

10. Device according to claim 9, in which the mold carriers are rotationally pivoted with respect to each other whereby at least one stop is located on the pivot (4) side of the mold carriers (3) and the quick-screwing means are located on the opposite side.

11. Device according to claim 1, characterized in that the shell holder (9) is also provided with members (24) for guiding the half-molds in order to close the mold.

12. Device according to claim 1, characterized in that at least one of the shell holders is equipped with pressure-compensating means suitable for maintaining the sealed closure of the mold during blow molding.

13. Device according to claim 1, characterized in that the shell holders (9) are equipped with a number of fluid pipes, by virtue of which it is possible to create suitable circuits for a given manufacture with a given impression.

14. Device according to claim 1, wherein said containers are bottles.

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15. A mold assembly for use in manufacturing molded thermoplastic containers comprising:

two mold shells each containing a half-impression of a substantial portion of the container to be molded;

two mold shell holders each defining a cavity for receiving each said respective mold shell such that each said respective mold shell is in at least partial mutual thermal-conduction contact with its respective shell holder; and

at least one quick-fixing locking member by which said mold shells are removably secured to said mold shell holders.

16. The mold assembly of Claim 15, further comprising at least one axial positioning assembly by which said mold shells are fixed in an axial direction with respect to said mold shell holders.

17. The mold assembly of Claim 16, wherein said axial positioning assembly comprises at least one meshing coupling member disposed on at least one of said mold shells and mold shell holders, and at least one complementary meshing coupling member disposed on at least one of said mold shells and mold shell holders.

18. The mold assembly of Claim 15, wherein said mold shell holders further comprise a number of internal fluid pipes and connections for the circulation of cooling and/or heating fluids.

19. The mold assembly of Claim 15, wherein at least one of said mold shells and/or mold shell holders define at least one cavity at the interface between said mold shells and mold shell holders into which pressurized fluid suitable for maintaining the sealed closures of the mold assembly may be interposed during the molding process.

20. The mold assembly of Claim 17, wherein said meshing coupling members further comprise a system of one or more mating ribs and grooves in said mold shells and mold shell holders.

21. The mold assembly of Claim 15, wherein said quick-fixing locking member comprises, on one side, at least one stop for positioning the parting face of said mold shell with respect to said mold shell holder and, on the other side, at least one quick-acting screw on the parting face of said mold shell holder with at least one clamping surface projecting from the parting face of said mold shell.

22. A mold assembly for use in manufacturing molded thermoplastic containers comprising:

two mold shells each containing a half-impression of a substantial portion of the container to be molded;

two mold shell holders each defining a cavity for receiving each said respective mold shell such that each said respective mold shell is in at least partial mutual thermal-conduction contact with its respective shell holder; and

at least one axial positioning assembly by which said mold shells are fixed in an axial direction with respect to said mold shell holders.

23. The mold assembly of Claim 22, wherein said axial positioning assembly comprises at least one meshing male coupling member disposed on at least one of said mold shells and mold shell holders, and at least one complementary meshing female coupling member disposed on at least one of said mold shells and mold shell holders.

24. The mold assembly of Claim 22, wherein said mold shell holders further comprise a number of internal fluid pipes and connections for the circulation of cooling and/or heating fluids.

25. The mold assembly of Claim 22, wherein at least one of said mold shells and/or mold shell holders define at least one cavity at the interface between said mold shells and mold shell holders into which pressurized fluid suitable for maintaining the sealed closures of the mold assembly may be interposed during the molding process.

26. The mold assembly of Claim 23, wherein said meshing male and female coupling members further comprise a system of one or more mating ribs and grooves in said mold shells and mold shell holders.

27. A mold shell for use in manufacturing thermoplastic containers comprising:

a cavity defining a substantial portion of a container; and

at least one male or female coupling member by which the mold shell can be fixed in an axial direction by meshing with a complementary male or female coupling member in any device employed to support said mold shell during the molding process.

28. The mold shell of Claim 27, wherein said defining cavity further comprises a neck portion, a sidewall portion, and a base portion.

29. The mold shell of Claim 27, wherein said male or female coupling member further comprises either a groove or a rib disposed about the exterior surface of said mold shell.

30. The mold shell of Claim 29, wherein said groove or rib is proximate the neck portion of the mold shell.

31. The mold shell of Claim 27, further comprising at least one clamping surface projecting from the parting face of said mold shell.

32. A method of producing a thermoplastic container using a preheated preform and a two stage mold assembly comprising the steps of:

mounting mold shell holders onto supporting hardware disposed on a mold machine;

making connections to said mold shell holders for the purpose of directing cooling and/or heating fluid through internal pipes in the walls of said mold shell holders;

assembling mold shell halves each containing a half-impression of a substantial portion of the container to be molded into said mold shell holders, engaging meshing complementary male and female coupling members in said mold shells and mold shell holders;

engaging at least one quick-fixing locking mechanism to secure said mold shell halves into said mold shell holders;

positioning a preheated preform of thermoplastic material between the mold shell halves;

closing the mold assembly;

expanding the preheated preform into the mold cavity defined in significant part by the mold shell halves to form the thermoplastic container;

opening the mold assembly; and

extracting the thermoplastic container.

33. The method of claim 32, further comprising the steps of:

making an additional connection to the mold shell holders for the purpose of introducing pressurized fluid into at least one cavity at the interface of the mold shells and mold shell holders; and

introducing pressurized fluid into at least one cavity at the interface between said mold shells and mold shell holders during the molding step to maintain the sealed closure of the mold assembly.